UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,789	11/14/2003	Alastair James Buchanan	1-24912	8772

46582 7590 11/20/2009
MACMILLAN, SOBANSKI & TODD, LLC
ONE MARITIME PLAZA - FIFTH FLOOR
720 WATER STREET
TOLEDO, OH 43604

EXAMINER	
MANCHO, RONNIE M	
ART UNIT	**PAPER NUMBER**
3664	

MAIL DATE	DELIVERY MODE
11/20/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/713,789	Applicant(s) BUCHANAN ET AL.	
	Examiner RONNIE MANCHO	Art Unit 3664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The amendment filed 8/28/09 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

"In the first method (shown in the flow diagram of Figure 3 of the accompanying drawings) additional information is obtained from a yaw sensor which measures the rate of yaw of the vehicle. This is used to determine a radius of curvature for the vehicle; accordingly the secondary processor 106 is acting as a vehicle path estimation apparatus. *This is projected to the target distance, with the secondary processor 106 acting as a first data processing apparatus, The point of intersection of this path with the projected lane markings at the target distance is used to determine the lane in which the host vehicle will be located by the secondary processor 106 acting as a second processing apparatus.* This selected lane is then used as in the preceding paragraphs in comparison with the radar data to select the correct lane for the target vehicle.

Replace the paragraph beginning at page 13, line 14 with the following new paragraph:

In a second method, illustrated in the flow chart of Figure 4 of the accompanying drawings the heading angle of the vehicle relative to the lane boundaries when the image is captured may be used, *with the secondary, processor 106 is acting as a vehicle path estimation apparatus*. Again, this can be projected onto the lane boundaries at the distance of the target *(with the secondary processor 106 acting as a first data processing apparatus)* to determine

(with the secondary processor 106 acting as a second processing apparatus) the lane in which the host vehicle will be located."

Applicant is required to cancel the new matter in the reply to this Office Action.

Drawings

2. The drawings were received on 8/28/09. These drawings are acknowledged.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-5, 7-23 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In claim 1, the specification has no support for the different claimed processors. Applicant in the response filed 1/26/09 used element 104 to represent a path estimation apparatus, and the same element 104 as a first data processing apparatus, and the same element 104 as a second data processing apparatus. Thus the claimed limitations are not supported in the specification to enable one skilled in the art to make and use the invention.

Now in the response filed 8/8/09 applicant indicates that it is the newly added second processor 106 that does the path estimation apparatus. Which processor should the examiner consider as the path estimation apparatus?

The rest of the claims are rejected for depending on a rejected base claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-5, 7-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Sawamoto et al (EP 0890470 A2).

Regarding claim 1, Sawamoto et al (abstract) disclose a target vehicle sensing apparatus for a host vehicle, the apparatus comprising:

a lane detection apparatus provided on the host vehicle which includes an image acquisition apparatus configured adapted to capture an image of at least a part of the road ahead of the host vehicle (col. 6, lines 10 et. seq., line 33);

a vehicle path estimation apparatus configured to estimate a projected path for the host vehicle (e.g. col. 7, lines.28 to 54, abstract);

a target vehicle detection means located on the host vehicle which is configured to identify the position of any target vehicles located on the road ahead of the host vehicle (Figs.

3&4), the position including data representing the distance of the target vehicle from the host vehicle (col. 5, lines 50-54);

first data processing apparatus configured to predict a target lane (abstract, fig. 3 and 4) in which the host vehicle will be located when it has traveled along the projected path by the distance to the target vehicle (col. 9, lines 14-44 et. seq., fig. 7);

second processing apparatus configured to compare the position of the target vehicle determined by the target detection apparatus with the position of the target lane to provide a processed estimate of the actual position of the target vehicle (col.7, lines 38 et seq., col. 9 lines 43 et seq.).

In the prior art (col. 9, lines 46 to col. 10, line 11) the processor 62 clearly predicts the position of the host vehicle in a future path. The processor 62 predicts" the future path of the host vehicle relative to a target vehicle when the host vehicle has traveled a distance between the host vehicle and the target vehicle (see particularly col. 9, line 51 and col. 10, lines 5-11).

Regarding claims 2, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the processed estimate comprises an indicator of whether or not the target vehicle is in the same lane as the host vehicle is projected to be in when the host vehicle has traveled along the projected path by the distance to the target vehicle (col. 2, lines 47-57; col. 9, lines 16-53; col. 10, lines 5-24).

Regarding claims 3, Sawamoto et al (abstract) disclose the apparatus of Claim 1, in which the image acquisition apparatus of the lane detection apparatus comprises a video camera 54 (fig. 3) which is configured to produce at least one two-dimensional image of an area of the road in front of the host vehicle (col. 6, lines 33-41).

Regarding claims 4, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the at least one image is passed to an image processing unit 55 (fig. 3).

Regarding claims 5, Sawamoto et al (abstract) disclose the apparatus of Claim 4 in which the image processing unit is configured to filter the at least one image to identify artifacts in the image corresponding to at least one of the right hand edge of a road, the left hand edge of the road, lane markings defining lanes in the road (col. 4, lines 29-47; col. 7, lines 7-12), the radius of curvature of the lanes and the road, and the heading angles (steering angle, col. 6, lines 31, 32) of the host vehicle relative to the road and lanes.

Regarding claims 7, Sawamoto et al (abstract) disclose the apparatus of Claim 4 in which the image processing unit is configured to apply an edge detection algorithm to the at least one image to detect lines or curves that correspond to lane boundaries.

Regarding claims 8, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the image processing unit is configured to perform a tracking algorithm which employs a recursive least squares technique to identify the path of lanes in the at least one image.

Regarding claims 9, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the output of the image processing unit comprises data representing lane topography which is passed to the first data processing apparatus (cols. 5-8).

Regarding claims 10, Sawamoto et al (abstract) disclose the apparatus of Claim 9 in which the output of the image processing unit also includes information including the position of the host vehicle relative to the identified lanes and its heading (cols. 5-8).

Regarding claims 11, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the first data processing apparatus is configured to determine which lane the host vehicle

will occupy when it has traveled the distance to a target vehicle by projecting the path estimated by the vehicle path estimation apparatus and comparing the path estimated by the vehicle path estimation apparatus with lane boundary information at that distance (cols. 5-9).

Regarding claims 12, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the vehicle path estimation apparatus is configured to use lane information to determine which lane the host vehicle is presently traveling in (cols. 3-8).

Regarding claims 13, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the vehicle path estimation apparatus may estimate the path by projecting a path based upon the heading of the host vehicle (cols. 3-8).

Regarding claims 14, Sawamoto et al (abstract) disclose the apparatus of Claim 12 in which the projected path corresponds to the path of the lane (cols. 5-8).

Regarding claims 16, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the vehicle path estimation apparatus includes a yaw sensor which is configured to determine the rate of yaw of the host vehicle in order to provide a measure of the radius of curvature of the path a vehicle is following (cols. 5-8).

Regarding claims 17, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the target vehicle detection apparatus comprises an emitter (see radar unit 2, fig. 3) which emits a signal outward in front of the host vehicle and a receiver which is configured to receive a portion of the emitted signal reflected from the target vehicle or objects in front of the vehicle, and a target processing apparatus which is configured to determine the distance between the host vehicle and the target vehicle or object (cols. 3-8).

Regarding claims 18, Sawamoto et al (abstract) disclose the apparatus of Claim 17 in which the emitter and the receiver emit and receive one of radar signals and lidar signals (cols. 3-8).

Regarding claims 19, Sawamoto et al (abstract) disclose the apparatus of Claim 17 in which the distance between the host vehicle and the target vehicle or object is determined by the target processing apparatus based upon the time of flight of a signal from emission of the signal to receipt of a reflected portion of the signal (cols. 3-8).

Regarding claims 20, Sawamoto et al (abstract) disclose an adaptive cruise control system for a host vehicle comprising:

sensing apparatus according to Claim 1 and signal generating apparatus configured to generate a steering bias signal which when applied to a steering system of the vehicle assists in controlling the direction of the vehicle so as to cause the host vehicle to track the target vehicle (see vehicle following unit, cols. 3-8).

Regarding claims 21, Sawamoto et al (abstract) disclose the control system of Claim 20 in which the signal generating apparatus generates at least one vehicle speed control signal which when applied to a brake system or a throttle control system of the vehicle cause the vehicle to maintain a predetermined distance behind a target vehicle (cols. 3-8).

Regarding claims 22, Sawamoto et al (abstract) disclose the control system of Claim 20 in which at least one of the signals is generated in response to the estimate of the target position determined by the sensing apparatus (cols. 3-8).

Regarding claims 23, Sawamoto et al (abstract) disclose the control system of Claim 20 in which the control signals are only generated for target vehicles that occupy the projected path of the host vehicle (cols. 3-5).

Response to Arguments

7. Applicants' arguments filed 8/8/09 have been fully considered, but are not persuasive.

Applicant's arguments are a repeat of arguments that had been addressed in the last office action dated 2/6/08. The arguments are still not convincing. For purposes of clarity, the response to applicant's arguments is reprinted below for applicant's review.

Applicant argues that claim 1 recites, "a target lane that is a prediction of which lane the host vehicle will be located when it has traveled by a distance to a target vehicle along a projected path. The target lane is compared to the position of the target vehicle". The examiner disagrees and notes that in the prior art (col. 9, lines 46 to col. 10, line 11) the processor 62 clearly predicts the position of the host vehicle in a future path is predicted. The processor 62 predicts the future path of the host vehicle relative to a target vehicle when the host vehicle has traveled a distance between the host vehicle and the target vehicle (see particularly col. 9, line 51 and col. 10, lines 5-11). Applicant has ignored and failed to consider the cited sections which anticipate the claims. Further, the positions of host vehicle and the target vehicle in the predicted lane are plotted in successive times tl, t2, t3, etc indicating a progression of the vehicles as they travel into the future in the predicted lane. The host vehicle is shown to maintain a distance behind a target vehicle as both vehicles travel in the predicted lanes. As the host vehicle moves from its current position toward a target vehicle, it is noted that the target vehicle also moves

ahead of the host vehicle to another position ahead of the host vehicle. The host vehicle then covers the distance of separation between the host vehicle and the target vehicle after the host vehicle travels to a position previously occupied by the target vehicle. The host vehicle tracks the target vehicle and keeps a historical map of positions occupied by the target vehicle in the predicted lane of travel thus estimating or predicting the future travel path of the target vehicle (see col. 9, line 51 and col. 10, lines 5-11).

The applicants are repeating arguments already addressed in the previous office actions. The responses in the last action are incorporated below. After the host vehicle of the prior art goes past the distance it maintains the same lane it is in. Therefore the prior has predicted a target lane in which the host vehicle will be located when it has traveled along the projected path by a distance to the target object. It is believed that the applicant has erred in the interpretation of the prior art.

Applicant further argues that the prior art does not predict the target lane. The examiner believes the applicant has erred in the interpretation of the prior art. It is noted that the prior art predicts in the same manner as disclosed in the applicants specification. Applicant uses the word "predict" in the disclosure, but does not particularly disclose how prediction is done. On the other hand, as known in the art, the phrase -- path estimation --, --projected path -- are examples of prediction that the applicant recites in the background section referring to the prior art. Applicant admits that the prior Sawamoto calculates a future path, see applicant's remarks, page 9, last paragraph. It is not clear what applicant is really arguing here when applicant admits that the prior estimates a path. The applicant further recites that the prior assumes that "the host vehicle WILL TRAVEL in this new lane". See applicant's argument page 11 last two sections.

These are all future tenses contrary to applicant's argument that the tenses in Sawamoto are in present tense.

It is believed that the prior art still reads on the claims. The rejections are believed to be proper and thus stand.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RONNIE MANCHO whose telephone number is (571)272-6984. The examiner can normally be reached on Mon-Thurs: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Khoi can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ronnie Mancho/
Primary Examiner, Art Unit 3664

/KHOI TRAN/
Supervisory Patent Examiner, Art Unit 3664